

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 10
Dkt 884,444US1

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on April 1, 2003, and the references cited therewith.

Claims 1, 3-4, 19, 25, 29, 32-34 are amended; claims 2, 11, 21-22, 31 and 35 are now canceled; and claims 39-48 are added; as a result, claims 1, 3-10, 12-20, 23-25, 27-30, 32-34 and 36-48 are now pending in this application.

Claims 21-22, 31 and 35 have been canceled solely to advance the prosecution of the present application, and without prejudice to their further prosecution in an appropriately filed continuing or divisional application.

The amendments made herein have been to clarify the claims and are not intended to limit the scope of equivalents to which any claim element may be entitled. The amendments to the claims have support throughout the specification. No new matter has been added as a result. Applicant respectfully requests reconsideration of the above-identified application in view of the amendments above and the remarks that follow.

§102 Rejection of the Claims

Claims 1, 18-20 and 24 were rejected under 35 USC § 102(e) as being anticipated by Ali et al. (U.S. 6,459,582).

Applicant does not admit that Ali is prior art, and reserves the right to swear behind it at a later date. Nevertheless, Applicant respectfully submits that the claims are distinguishable over Ali for the reasons argued below.

The Office Action states that Ali teaches an apparatus (shown in FIG. 2) for removably attaching a thermal solution as recited in claims 1 and 19, the apparatus made from steel.

Ali discusses a clamping system which decouples the clamping forces in an electrical circuit assembly coupled to a heatsink. Ali relies on separate studs to clamp the assembly together.

In contrast, claim 1, as amended, recites an apparatus for attaching a thermal solution to a circuit board comprising a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor, the processor located on the circuit board; a backing

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 11

Dkt: 834,444US1

plate connectable to the mounting plate, the backing plate designed to prevent flexure of the circuit board; and a plurality of locking pins, each having a first end and a second end, the first end slideable within a slot in the mounting plate and the second end securable to the circuit board and to the backing plate, the plurality of locking pins capable of being aligned and positioned simultaneously, and designed to keep the mounting plate in contact with the processor. Claim 19, as amended, recites a removable thermal solution attachment mechanism comprising a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor located in a package; a backing plate designed to connect to the mounting plate; and a plurality of locking pins securable to the backing plate, each locking pin having one or more bosses insertable into slots in the mounting plate, each slot having a substantially horizontal shelf, the plurality of locking pins capable of being aligned and positioned in the slots simultaneously, wherein the thermal solution imparts a force on the package when secured to the mounting plate opening, further wherein the thermal solution can remove heat from the processor.

Ali does not teach each element of the claims because it does not teach, for example, a plurality of locking pins slideable within a slot, nor locking pins capable of being aligned and positioned simultaneously.

Ali does not anticipate the claims, as amended. Applicant respectfully submits that claims 1 and 18-20 are allowable in their present form and notification to that effect is respectfully requested.

The Office Action further states, regarding claim 24, that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Applicant respectfully traverses this characterization of claim 24 and the rejection of claim 24 under 102(e).

As noted above, Ali does not anticipate the claims, as amended. Applicant respectfully submits that claim 24 is allowable in its present form and notification to that effect is respectfully requested.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 12
Dkt: 884.444US1**§103 Rejection of the Claims****Claims 14-17 and 29-30**

Claims 14-17 and 29-30 were rejected under 35 USC § 103(a) as being unpatentable over Ali et al.

Applicant respectfully traverses the single reference rejection under 35 U.S.C. § 103 since not all of the recited elements of the claims are found in Ali. Since all the elements of the claim are not found in the reference, Applicant assumes that the Office Action is taking official notice of the missing elements. Applicant respectfully objects to the taking of official notice with a single reference obviousness rejection and, pursuant to MPEP § 2144.03, Applicant respectfully traverses the assertion of Official Notice and requests that the Examiner cite references in support of this position or withdraw this rejection.

The Office Action states that, regarding claims 14 and 17 (partially), Ali teaches all the limitations except that the heat sink can be attached to the circuit board temporarily or permanently, but that both the claimed structure and the structure by Ali can be used either temporarily or permanently. The Office Action further states that, regarding claims 15-16 and 17 (partially), that Ali teaches all the limitations except for the circuit board thickness and watts of power removable and that it would have been obvious to use such a range of sizes. The Office Action further states, regarding claims 29-30 that the method steps are necessitated by the device structure as shown in Ali and that the steps recited in claim 29 only imply the intended use of the device structure.

Applicant respectfully submits that the Office Action has not established the *prima facie* obviousness of the present claims. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 13
Dkt: 884,444US1

applicant's disclosure. MPEP 2142 (citing In re Vaack, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

Ali does not teach or suggest the claimed invention for at least the reasons stated above.

Applicant further notes that claims 14-17 and 30 are dependent claims. The additional limitations provided in dependent claims cannot by themselves be rendered obvious over the cited references if the independent claim from which it depends is determined to be nonobvious.

Applicant also respectfully traverses the assertion that claim 29 only "implies" the intended use of the device structure. Claim 29, as amended, recites a method for temporarily attaching a thermal solution to a circuit board comprising providing a thermal solution attachment mechanism having first and second plates and a set of connectors to connect the first and second plates together; placing a circuit board between the first and second plates; simultaneously inserting the set of connectors into slots on the first plate; simultaneously sliding the set of connectors along shelves located in the slots, wherein the first and second plates are connected; securing a thermal solution to an opening in the first plate wherein the thermal solution contacts a package located on the circuit board; testing the circuit board, wherein heat is removed by the thermal solution from a processor located in the package; and removing the thermal solution attachment mechanism from the circuit board. Applicant is the first to provide such a method.

The references neither independently, or combined, contain each and every element of Applicant's claimed invention. (When evaluating the scope of a claim, every limitation in the claim must be considered. In re Ochiai, 37 USPQ2d 1127 (Fed. Cir. 1997)).

Applicant respectfully submits that independent claim 1, from which claims 14-17 depend, as well as independent claim 29, from which claim 30 depends, are patentably distinct from the cited references, either alone or in combination. Claims 14-17 and 29-30, as amended, each viewed as a whole, are not suggested by the cited references and not obvious under 35 USC § 103(a).

Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 1, 3-10, 12-38

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 14
Dkt: 884.444US1

Claims 1, 3-10, 12-25 and 26-38 were rejected under 35 USC § 103(a) as being unpatentable over Kehley et al. (U.S. 5,919,050) in view of McCullough et al. Applicant presumes the Office Action is referring to McCullough et al. (U.S. Patent No. 6,014,315). Applicant notes that claim 26 was previously canceled and so should not be listed as rejected herein under 35 USC 103(a). Additionally, this rejection is moot as to claims 21-22, 31 and 35, which have now been canceled.

The Office Action states that Kehley teaches an apparatus in FIGS. 1-10 for attaching a passive thermal solution to a circuit board and to a package and notes various elements of the rejected claims. The Office Action further states that the processor in Kehley does not teach the mounting plate having an opening designed to allow the heat sink to contact a processor, the heat sink having a threaded base engageable with threads in the mounting plate opening, but that McCullough teaches an apparatus (shown in FIG. 2) for attaching a thermal solution to a circuit board and to a package and notes various elements of the rejected claims. The Office Action concludes that it would have been obvious to employ a heat sink screwed into a mounting plate as shown in McCullough in the device of Kehley in order to simplify assembling and disassembling of the device.

Regarding claims 15-17 and 34, the Office Action states that Kehley teaches all the limitations of the claims except for the circuit board thickness and watts of power removable and that it would have been obvious to use such a range of sizes.

Regarding claims 10 and 13, the Office Action states that Kehley teaches all the limitations of the claims except the pressure imparted to the processor, which would have been obvious.

Regarding claim 18, the Office Action states that Kehley teaches all the limitations of the claim except said mounting plate, backing plate and connector, each made from the recited material, and that it would have been obvious to make these parts from these materials.

The Office Action further states that the method steps are necessitated by the device structure as Kehley and McCullough show it.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 15
Dkt: 884,444US1

Applicant respectfully rejects the various assertions made in the Office Action and again submits that the Office Action has not established the *prima facie* obviousness of the present claims.

Also, claims 3-10, 12-18, 20, 23-24, 27-28, 30, 32-33 and 36-38 are dependent claims. Applicant again notes that the additional limitations provided in a dependent claim cannot by themselves be rendered obvious over the cited references if the independent claim from which it depends is determined to be nonobvious.

Kehley does not teach or suggest the claimed invention. Kehley discusses a socket that connects electronic components, such as integrated circuit modules with arrays of solder balls or columns, lands, pads of similar contact to other components, typically substrates such as printed circuit boards. As the Office Action admits, Kehley does not teach a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor or a thermal solution secured to an opening in the plate.

In contrast, claim 1, as amended, recites a mounting plate having a mounting plate opening. See also claims 19, 25, 29 and 34, as amended.

McCullough does not overcome the deficiencies of the primary reference. McCullough discusses a heat dissipating device that does not teach or suggest a backing plate. The device can provide multiple levels of pressure to a semiconductor package, having an outer peripheral ceramic region and an inner silicon region.

Clearly, the product in the primary reference and the product in the secondary reference are all fundamentally different from each other and such critical differences must be recognized. In re Bond, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990), *reh'g denied*, 1990 U.S. App. LEXIS 19971 (Fed. Cir. 1990).

Additionally, there is simply no suggestion in Kehley *as to the desirability* of providing a mounting plate opening. There is further no indication of any appreciation of the problem being solved by Applicant's invention. When a person, having the references before him and not cognizant of Applicant's disclosure, would not be informed that a problem (solved by Applicant's claimed invention) ever existed, such references (which never recognized the problem) *could not have suggested its solution*. Combining references in this manner is improper. In re Shaffer, 229

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 16
Dkt. 884.444US1

F.2d 476, 108 USPQ 326, 329 (CCPA 1956). Focusing on the obviousness of substitutions and differences instead of on the invention as a whole is a legally improper way to simplify the difficult determination of obviousness. Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 231 USPQ 81, 93 (Fed. Cir. 1986).

It is also not clear that such modification would be successful, but the mere fact that the prior art may be modified in the manner suggested by the Office Action does not make the modification obvious unless the prior art suggested the desirability of the modification. Additionally, motivation to combine the references must come from within the references themselves and cannot be generated by "hindsight or reconstruction." In this instance, there is simply no suggestion or motivation, either in the cited references themselves or in the knowledge generally available to an art worker, to combine the reference teachings as suggested. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988). Applicant requests the Office Action to either provide evidence of such motivation or withdraw this rejection.

It has also been established that the Office Action must provide specific, objective evidence of record for a finding of a suggestion or motivation to combine reference teachings and must explain the reasoning by which the evidence is deemed to support such a finding. In re Sang Su Lee, 277 F.3d, 1338, 61 USPQ2d 1430 (Fed. Cir. 2002). Statements in the Office Action such as, "It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a heat sink screwed into a mounting plate as it is shown by McCullough et al in the device by Kehley et al in order to simplify assembling and disassembling of the device," are conclusory statements of subjective belief. (See also statements noted above with respect to claims 15-17 and 34; claims 10 and 13, claim 18 and claim 24). Conclusory statements do not adequately address the issue of motivation to combine. In re Sang Su Lee, supra. Essentially, the current invention has been used as a roadmap to identify the purpose leading one to make the combination. The Office Action has not provided objective evidence for a suggestion or motivation to combine the references and the rejection should be withdrawn.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 17
Dkt: 884,444US1

In any case, the suggested combination does not teach each and every element of Applicant's claims. Applicant is the first to provide an apparatus for attaching a thermal solution to a circuit board comprising a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor, the processor located on the circuit board; a backing plate connectable to the mounting plate, the backing plate designed to prevent flexure of the circuit board; and a plurality of locking pins, each having a first end and a second end, the first end slideable within a slot in the mounting plate and the second end securable to the circuit board and to the backing plate, the plurality of locking pins capable of being aligned and positioned simultaneously, and designed to keep the mounting plate in contact with the processor, as recited in claim 1, as amended. Applicant is also the first to provide a removable thermal solution attachment mechanism comprising a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor located in a package; a backing plate designed to connect to the mounting plate; and a plurality of locking pins securable to the backing plate, each locking pin having one or more bosses insertable into slots in the mounting plate, each slot having a substantially horizontal shelf, the plurality of locking pins capable of being aligned and positioned in the slots simultaneously, wherein the thermal solution imparts a force on the package when secured to the mounting plate opening, further wherein the thermal solution can remove heat from the processor, as recited in claim 19, as amended. Applicant is also the first to provide a method for attaching a thermal solution to a circuit board comprising placing a mounting plate on top of a processor, the processor located on a top surface of the circuit board and the mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor, simultaneously aligning slots on the mounting plate with locking pins securable to the circuit board; providing a backing plate designed to give support to the circuit board, the locking pins also securable to the backing plate; simultaneously inserting one end of each locking pin into each mounting plate slot; simultaneously sliding each locking pin along a shelf located in each mounting plate slot; and securing a thermal solution to the mounting plate, as recited in claim 25, as amended. Applicant is also the first to provide a method for temporarily attaching a thermal solution to a circuit board comprising providing a thermal solution attachment mechanism having first and second plates and a set of connectors to

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 18

Dkt: 884.444US1

connect the first and second plates together; placing a circuit board between the first and second plates; simultaneously inserting the set of connectors into slots on the first plate; simultaneously sliding the set of connectors along shelves located in the slots, wherein the first and second plates are connected; securing a thermal solution to an opening in the first plate wherein the thermal solution contacts a package located on the circuit board; testing the circuit board, wherein heat is removed by the thermal solution from a processor located in the package; and removing the thermal solution attachment mechanism from the circuit board, as recited in claim 29, as amended. Applicant is also the first to provide a apparatus comprising a mounting plate having a mounting plate opening designed to allow a thermal solution to contact a processor, the processor located on a circuit board, wherein the circuit board is greater than about 1.5 mm in thickness; and four locking pins designed to keep the mounting plate in contact with the processor, each locking pin having a first end and a second end, the first end of each locking pin simultaneously securable to a corresponding key-hole shaped slot in the mounting plate, wherein each key-hole shaped slot has a shelf along which the locking pin can slide, the second end of each locking pin securable to the circuit board, as recited in claim 34, as amended.

The references neither independently, or combined, contain each and every element of Applicant's claimed invention. (When evaluating the scope of a claim, every limitation in the claim must be considered. In re Ochiai, 37 USPQ2d 1127 (Fed. Cir. 1997)).

Applicant respectfully submits that independent claims 1, 19, 25, 29 and 34 and the claims which depend therefrom, are patentably distinct from the cited references, either alone or in combination. Claims 1, 3-10 and 12-38, as amended, each viewed as a whole, are not suggested by the cited references and not obvious under 35 USC § 103(a).

Reconsideration and withdrawal of this rejection is respectfully requested.

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AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872628

Filing Date: June 1, 2001

Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

Assignee: Intel Corporation

Page 19
Dkt: 884.444US1

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Office Action is invited to telephone Applicant's attorney Barbara Clark at (515) 233-3865, or the undersigned attorney 612-349-9592, to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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By Ann M. McCrackin

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 1 day of July, 2003.

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Name

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Signature